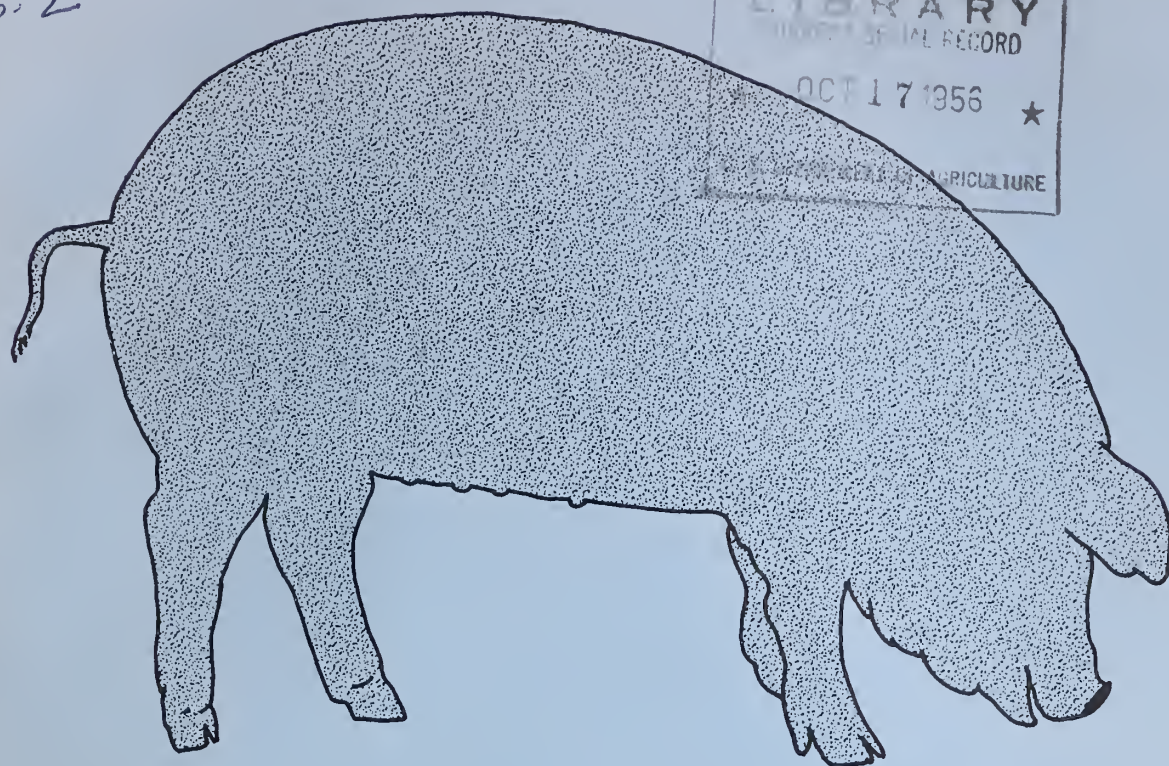


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Price Differentials for **Live Graded Hogs**

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Farmer Cooperative Service
U. S. Department of Agriculture

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SUMMARY

Farmer Cooperative Service made this study to test the results of handling live graded hogs in cooperative markets under commercial operating practices. A check was made to determine if price differentials paid in the market place were reflected in carcass values when the hogs were slaughtered and processed.

Over 160,000 hogs were live graded and 1,645 were followed through slaughter plants to obtain detailed information on the cut-out results.

The No. 1 live hogs sold at an average of about 65 cents per 100 pounds over the No. 2's for the year under test. At the beginning of this study farmers received a 50-cent differential per 100 pounds. Later this was raised to 75 cents per 100 pounds.

The difference in cut-out value for 1953-54 between No. 1 and No. 2 grades was \$1.17 per 100 pounds when converted to a live weight basis, while the difference would have been \$1.44 for 1952 a year when hogs were more plentiful. The difference in value resulted largely from the fact that the No. 1 hogs had more weight in the five primal cuts. There was no consideration given to fat-lean ratio in pricing the same cut from hogs of different grades. Adopting the practice of grading and pricing wholesale pork cuts on a quality basis would tend to widen this spread. On the basis of data obtained in this study, it appears that farmers are entitled to receive a greater differential for No. 1 hogs.

Effect of transportation on dressing percentage needs further investigation to determine why No. 2 hogs shrank more than No. 1 hogs after being hauled over 500 miles before slaughter.

The grades applied to these live hogs were as follows: Ohio No. 1, No. 2, and No. 3. (See appendix.) Hogs graded No. 1 were described as above the average quality marketed. Hogs rated No. 2 were considered the average for the Ohio market area while No. 3 hogs were overfat.

Of the total graded, 40 percent were No. 1's, nearly 60 percent were No. 2's, and less than 1 percent fell into the No. 3 grade. An insufficient number of No. 3 grade hogs were graded to make a fair sample to consider in this test. Farmers were able to recognize their overfat hogs and did not consign them for the grading program. Further investigation with equal numbers of all grades of hogs would probably have given better comparisons.

Live weight of hogs graded varied both within and between the grades used. The range in average weight by months within the No. 1 grade hogs was over 7 pounds a head; No. 2 hogs had a range of about 10 pounds. The average differences in live weight between the grades were less than the differences between individual lots within the grades. The spread in average weight between the No. 1 and No. 2 grades was 4.4 pounds.

II

The scarcity of hogs which developed during the test period affected the results of the study, as demand for pork products forced the price level upward with little regard for quality of the cuts. This was noted particularly in a smaller spread between bellies and fat in comparison with the lean cuts - hams, loins, butts and picnics.

The results reflected cut-out values that can be expected in day-to-day marketing and in slaughter establishments operating under accepted commercial practices.

The meat trade does not agree as to the amount of finish a hog must carry to guarantee good quality pork cuts. Some prefer a fairly thin hog almost bordering on medium grade. Others insist on considerably more finish for a No. 1 hog.

PRICE DIFFERENTIALS FOR LIVE GRADED HOGS

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A live grading program with the payment of price differentials for different grades of hogs has become an accepted practice and is now followed by several marketing agencies and meat packers. Great progress has been made through adopting definite grades of live hogs, and interest in marketing hogs more nearly on their merits is growing in all segments of the industry.

Interest in price differentials for live graded hogs has been increasing among cooperative and private marketing groups, as well as slaughterers, for several years. Almost all segments of the livestock marketing and processing industry have recognized the need for buying and selling hogs on the basis of the cut-out value.

Adoption of new U. S. Department of Agriculture live hog grades in 1952 encouraged wider acceptance and use of grades and price differentials in buying and selling live hogs.

Many slaughterers have indicated willingness to buy hogs on a price differential basis if the hogs will show the differences in value after the animals have been processed.

The problem has been how to grade all butcher hogs when operating under commercial practices and establish prices which will recognize quality and cut-out results of the various grades. Grading live hogs is not an exact science for grade cannot be determined on a completely mechanical basis. It is largely a question of human judgment which must be checked often against carcass grade results. The live hog grader needs additional information to keep his sights in line with the kinds of carcasses expected within the different grades. Marketing interests require additional information to insure fair and equitable price differentials to the farmers.

Many hog slaughterers have contended that in their day-to-day operations they have been unable to secure the price differentials reported where grading, slaughtering and cutting were done under controlled conditions and on small lots or individual animals. There has been considerable research work in yield value of hogs on a controlled basis but very few reports reflect results under actual commercial operations.

This study, based on data from grading live hogs and the figures reflecting cut-out results in 1953-54 was designed, therefore, to provide working experience and shed additional light on this very complex problem.

This meant checking results of handling graded hogs through regular marketing channels and testing the hogs at packing plants where they were slaughtered and processed under commercial packer methods to determine their value according to grades.

A further objective was to supply farmers and their marketing organizations with factual cut-out data secured on commercial scale operations.

PROCEDURE

The Producers Livestock Cooperative Association of Columbus, Ohio, was selected as the cooperating agent. This marketing cooperative had pioneered in grading live hogs and selling on a basis of price differentials. Their experience had met with a fair measure of success, but the officials of this association recognized that additional research was needed to set more accurate price differentials which reflected actual value differences.

Hogs used in this study were consigned by farmers to the cooperative's local markets, then graded and sold to slaughterers at a price differential for the various grades. Several tests were conducted at meat packing plants to determine the cut-out results of these graded hogs. These plants operated under their regularly established methods.

Slaughter plants were chosen in the immediate production area as well as some a few hundred miles away to determine the effects of transportation and handling. The packing plants cooperating in the cut-out and yield tests from the live graded hogs were located on the Atlantic Seaboard and in Ohio. At these plants the hogs were slaughtered and the carcasses broken into wholesale cuts, making it possible to determine the value of the various lots of graded hogs.

PROBLEMS ENCOUNTERED

Problems often arise that cause results to differ somewhat in commercial slaughter operations from those found when researchers can have full control of all phases of test work and can oversee all the methods of procedure.

A number of problems were encountered in carrying out this study. Two of these were:

1. Lack of livestock scales at all packing plants. It would have been desirable to have loading weights of the hogs at points of origin and unloading weights at the slaughter plant. These weights would have provided more information on shrink in transit. With no scales at some packing plants it was not always possible to secure these data.

2. Light run of hogs during the period of this project. There was a marked decline in production and marketing of hogs in the fall of 1953 and the spring of 1954. In an effort to secure supplies so they could maintain kill gangs packers bid up ungraded hogs to provide numbers rather than purchasing hogs strictly on the basis of grade and quality. This smaller supply modified results of the tests because it tended to narrow the price differentials between grades. The differential between No. 1 and No. 2 hogs was 23 percent greater when 1952 prices were applied. Hog production was larger in 1952 and the supply of pork products therefore was greater.

In spite of these problems, the investigation is a step in the right direction and reveals to some extent the weaknesses as well as the possibilities ahead in marketing hogs by grade.

RESULTS OF LIVE GRADED HOG TESTS

During the period of the contract, 161,523 hogs were live graded at 27 markets in Ohio and Indiana operated by Producers Livestock Cooperative Association. These hogs were graded on definite days designated as hog pool days at each market for grading hogs. Graded hogs represented only a portion of the total sold as these markets operated 5 days each week to sell farmers' hogs.

Hogs were live graded using standards developed by Ohio State University and Producers Livestock Cooperative Association (Appendix tables 1 and 2). An extension livestock specialist of Ohio State University assisted in training the graders employed by Producers.

The 161,523 hogs were divided into the following grades:

<u>Grade</u>	<u>Percent</u>
No. 1	40.09
No. 2	59.60
No. 3	.31

Table 1 shows the hogs graded at contractors' markets using Ohio standards and average weight, by months, during the year under study. The small number of No. 3 grade may be explained by the fact that farmers were able to recognize this type of over-fat hog, and did not consign them to the market to be graded, knowing they would be subject to a discounted price less than average market quotations. They sold their No. 3 hogs outside the grading program. For this reason the 161,523 hogs graded in this project probably do not represent an accurate cross section of all hogs being produced and marketed in the area from which these originated.

The number of hogs graded was lowest during May and June following the historical marketing pattern for the Eastern Corn Belt (Table 1).

Table 1. - Number of hogs graded, by months, July 1, 1953, to June 30, 1954

Month and year	No. 1 grade		No. 2 grade		No. 3 grade	
	Number	Average	Number	Average	Number	Average
	of head	weight (pounds)	of head	weight (pounds)	of head	weight (pounds)
<u>1953</u>						
July	4,473	196.55	6,740	199.70		
Aug.	6,567	197.00	11,335	202.26	71	210.49
Sept.	6,537	199.98	11,707	208.25	8	220.00
Oct.	6,770	201.93	9,903	203.60	24	190.21
Nov.	5,137	203.22	7,013	209.81	22	210.68
Dec.	3,907	203.94	5,475	206.69		
<u>1954</u>						
Jan.	5,573	203.73	6,289	207.47	10	223.50
Feb.	8,324	201.98	11,899	206.34	220	212.93
Mar.	7,664	201.34	11,805	206.83	115	200.22
Apr.	4,275	202.04	5,779	202.86	12	208.33
May	2,785	201.35	3,818	205.66		
June	2,740	198.97	4,518	204.09	8	236.88
Total	64,752	201.0	96,281	205.4	490	215.7

In 4 months - June, July, August and September - No. 1 grade hogs averaged under 200 pounds live weight. This probably was because hogs were in short supply and farmers were rushing their hogs to market to take advantage of what appeared to be a high market price.

The average difference in selling price between No. 1 and No. 2 grades for the year in which records were obtained was 65 cents per 100 pounds. Packers and slaughterers seemed to feel that this was a reasonable difference and purchased hogs freely on this basis.

The quantity of No. 3 hogs offered was too small a sample to give a satisfactory comparison of the price differential but the overall average live price for this grade would normally have been 50 cents lower than No. 2 and \$1.00 to \$1.25 lower than No. 1 hogs. No. 3 grade hogs represented less than one-half of 1 percent of the graded hogs sold and were available only a few times during any month. If the No. 3 hogs had been graded at every market, there probably would have been a greater differential than indicated in table 2.

At the beginning of the test the marketing cooperative had an established price differential between No. 1 and No. 2 grade hogs of 50 cents per 100 pounds. Later this differential was increased to 75 cents. During the period in which the contract was in force, ungraded hogs were sold generally at the average price of No. 2 graded hogs.

Table 2. - Average monthly prices per 100 pounds at which graded hogs were sold -- July 1, 1953, to June 30, 1954.

Month	No. 1 grade	No. 2 grade	No. 3 grade
<u>1953</u>			
July	\$ 26.79	\$ 26.32	\$ 25.17
August	25.03	24.54	24.75
September	25.09	24.58	21.00
October	22.51	22.01	22.75
November	22.06	21.45	
December	25.61	24.92	
<u>1954</u>			
January	26.81	26.14	26.25
February	26.77	26.05	26.50
March	26.74	26.01	25.62
April	28.52	27.80	28.50
May	28.07	27.36	
June	26.27	25.51	24.38
Yearly average	25.96	25.31	25.12

CARCASS YIELD AND VALUES

A sample of the graded hogs was followed through slaughter to determine the cut-out yields and to relate value of salable meat to the live animals. Every attempt was made to handle these hogs in a uniform manner and still conform with the regular commercial operating practices of the slaughter plants processing the hogs.

Hogs included in the cut-out tests were classified as follows:

<u>Grade</u>	<u>Live weight (pounds)</u>	<u>Number of hogs</u>	<u>Dressing percentage (percent)</u>
No. 1	204.0	1,000	69.86
No. 2	209.2	580	70.17

Average prices of pork cuts for 1 year - July 1, 1953, to June 30, 1954 - were used to determine prices for the hogs under study during an identical period of time. This Chicago price series was taken from the "National Provisioner" daily market service reports. It is a source universally referred to by the meat-packing industry and salesmen in making price determinations.

The live weight value of the graded hogs was obtained by dividing actual live weight of the hogs into the total value of the wholesale cuts. This value has been used on a basis of 100 pounds live weight for comparative purposes in this study.

The scarcity of hogs during this test period caused a price relationship in which fat cuts were about the same price as lean cuts. For instance, the prices in 1952 when hogs were more plentiful resulted in a wider value spread between the pork cuts than during the test.

The price differential may be influenced considerably whenever the price relationship between the lean and fat cuts is changed.

No. 1 hogs were found to have live weight value of \$25.73 per 100 pounds while No. 2's had live value of \$24.56. Thus there was a difference of \$1.17 between the graded hogs falling in the No. 1 and those in the No. 2 grades. The difference using 1952 prices when hogs were more plentiful was \$1.44 (table 3). Because of the small number of No. 3 grade it was felt that results were not sufficiently accurate to be used as the basis for recommendations. Further study, with good representation of all grades, would be desirable. The numbers of hogs represented in No. 1 and No. 2 grades were large enough to consider for comparative purposes.

Dressing percentage or carcass yield from the live weight of these hogs was fairly uniform. The No. 1 grade yielded 69.86 percent; No. 2 grade yielded 70.17 percent; and No. 3 grade yielded 69.83 percent.

The difference in dressing percentage between the No. 1 and the No. 2 grade hogs was only 0.31 percent, while the yield between the No. 1 and No. 3 grades was about equal.

Table 3 lists the cuts weighed and priced in determining yield and value of the hogs in cut-out tests.

If only the four lean cuts - hams, loins, butts and picnics - were considered in the value based on live weight, the results were:

<u>Value per 100 pounds</u>	<u>1953-54</u>	<u>1952</u>
No. 1 grade	\$16.61	\$14.94
No. 2 grade	<u>15.24</u>	<u>13.44</u>
Difference	\$ 1.37	\$ 1.50

The yields of these four lean cuts is generally considered a criterion for determining the value of the hog. In this test the value based on four lean cuts and the overall value of all cuts had a similar differential between the grades.

The difference between No. 1 and No. 2 grades in 1953-54 when the four lean cuts were considered was \$1.37 while this difference was widened to \$1.50 a hundredweight in 1952 because of a more plentiful supply of hogs coming to market.

Table 3 - Value per 100 pounds of live weight of cuts of hogs according to grade using two different pricing periods

Cut	No. 1 grade		No. 2 grade	
	1953-54	1952	1953-54	1952
Hams	\$ 7.00	\$ 6.18	\$ 6.24	\$ 5.41
Loins	5.40	5.08	5.04	4.61
Picnics	1.99	1.72	1.93	1.67
Butts	2.22	1.96	2.03	1.75
Bellies	5.12	3.03	4.71	2.78
Fat ¹ / ₂	1.67	.93	2.15	1.18
Regular lean trimmings	.76	.58	1.01	.76
Spareribs	.78	.67	.67	.58
Jowls	.38	.21	.38	.20
Neckbones	.16	.12	.15	.11
Hocks	.13	.11	.12	.10
Tails	.03	.02	.03	.02
Hind feet	.05	.04	.05	.04
Front feet	.04	.04	.05	.04
Total	\$25.73	\$20.69	\$24.56	\$19.25

¹/₂ Includes backfat, clear plates and trimmings.

Table 4 shows the average weight of the five primal cuts. Hams from grades No. 1 and No. 2 fell into the same weight range although the No. 1 hogs did produce hams weighing 1.21 pounds heavier than those from the No. 2 hogs. This increased the value in 1953-54 of the No. 1 hogs 76 cents over the No. 2 hogs. Loins were 0.57 of a pound heavier in the No. 1's than in the No. 2's, with an increased value of 36 cents.

All of the hams from these test hogs exceeded 12 pounds in weight, which placed this cut in the 12- to 14-pound weight bracket, while hams ranging from 10 to 12 pounds carried the highest price in the market place. This has created a problem in all the improvement work on hogs because hams are generally penalized in the trade when they fall into a higher weight bracket. Price quotations do not give due consideration to higher proportion of lean to fat which these hams from the better grade of hogs might contain.

One of the most important measures of carcass value has been found to be backfat thickness; however, other factors influence overall value. The No. 1 grade hogs had slightly over one-quarter inch less backfat than the No. 2's which indicated that the No. 1's would be higher in value. Considerable difference in length was also noted in these tests (table 5). The No. 1's measured 1.29 inches longer than the No. 2's.

Table 4 - Average weight in pounds of the five primal cuts by grades of test hogs

Grade	Hams	Loins	Bellies	Picnics	Butts
No. 1	13.40	11.19	11.01	6.24	5.36
No. 2	12.19	10.62	10.52	6.08	4.92

Table 5 - Measures of carcass value for grades No. 1 and No. 2

Measurement	No. 1 grade	No. 2 grade
Backfat thickness	1.46 inches	1.76 inches
Carcass length	29.53 inches	28.24 inches
Carcass weight in 4 lean cuts	50.75 percent	48.57 percent

GRADING COMPARISON

The grading of these hogs compared favorably with the standards set up by the United States Department of Agriculture. The carcass testing work showed that hogs graded under Ohio standards had length, backfat thickness, and yield characteristics similar to those indicated by Federal grades (table 5). According to Ohio standards, No. 1 hogs yielded on the low side.

Several loads of hogs were examined and placed within grades on the rails at the slaughter plants by a grader from the slaughter plant and one from Ohio State University. They found when the carcasses were graded that the market grader had placed the live hogs with an average of 90 percent accuracy. The low percent of accuracy was 87 percent and the high 92 percent.

EFFECT OF TRANSPORTATION ON DRESSING PERCENTAGE

This study gave some information on effects of transportation upon graded hogs. It was impossible to obtain uniform data because of lack of comparable facilities at all the slaughter plants where tests were conducted. A few of the plants lacked proper scale facilities for weighing live hogs. Others followed the practice of either weighing off the car or truck without feed and water, while still others weighed after feeding and watering. These practices made it impossible to make comparable study of shrinkage in transit on all hogs.

A check of dressing percentage was made on the hogs tested where carcasses were weighed at the slaughter plants.

The No. 1 grade hogs slaughtered 1 day after purchase and within 50 miles of the market dressed 0.92 percent more than those slaughtered 3 days later and hauled 500 miles before slaughter.

The No. 2 grade hogs slaughtered 1 day after purchase and within 50 miles of the market where purchased dressed 1.6 percent more than those slaughtered 3 days later and hauled 500 miles before slaughter.

Further research should be conducted to determine if these results are representative of all cases.

APPENDIX

Appendix Table 1. -- Ohio adjusted standards for grading hogs by grades for three weight groups

Weights and grades		Percent of:		Range in inches		
		: four :		Backfat	Body length	Hind leg
		: lean cuts : : (range :				
Carcass weight	115-135 lbs.					
Equivalent live weight	170-195 lbs.					
	Grade No. 1	52.5 and up	1.4 and under	28.0 and up	18.7 and up	
	Grade No. 2	48.5 - 51.5	1.5 - 1.7	27.5 - 27.9	18.4 - 18.6	
	Grade No. 3	Under 47.5	1.8 and up	Under 27.5	Under 18.4	
Carcass weight	135-155 lbs.					
Equivalent live weight	195-220 lbs.					
	Grade No. 1	51.4 and up	1.6 and under	29.0 and up	19.6 and up	
	Grade No. 2	47.5 - 50.9	1.7 - 1.9	28.5 - 28.9	19.1 - 19.5	
	Grade No. 3	Under 47.0	2.0 and up	Under 28.5	Under 19.1	
Carcass weight	155-175 lbs.					
Equivalent live weight	220-250 lbs.					
	Grade No. 1	51.0 and up	1.7 and under	30.0 and up	20.1 and up	
	Grade No. 2	47.0 - 50.4	1.8 - 2.0	29.2 - 29.9	19.4 - 20.0	
	Grade No. 3	Under 46.5	2.1 and up	Under 29.2	Under 19.4	

Note: Includes the overlap of grades No. 1 and No. 2
Includes the overlap of grades No. 2 and No. 3

An overlap exists in the percent of four lean cuts between grades No. 1 and No. 2, and No. 2 and No. 3. This overlap amounts to 1 percent of 170 to 195 pounds live weight group, and 0.5 percent in the medium and heavy weight groups. The overlap includes the hogs which are graded as low No. 1 and high No. 2, and low No. 2 and high No. 3.

Appendix Table 2. -- Hams, loins, picnics, butts, and bellies expressed as a percentage of carcass weight by grades

Weights and grades	Hams		Loins		Picnics		Butts		Bellies	
	Average	Range	Average	Range	Average	Range	Average	Range	Average	Range
Carcass weight:										
Percent										
115 - 135										
Grade No. 1	20.0	18.4-22.6	16.0	14.7-18.8	10.0	8.5-11.3	7.8	6.9-9.5	15.0	12.6-17.4
Grade No. 2	18.6	16.9-20.2	14.7	11.6-16.8	9.3	7.9-10.7	7.2	5.9-8.9	16.3	13.3-18.5
Grade No. 3	17.5	16.0-18.6	13.5	11.7-14.8	8.9	8.1-9.6	6.6	5.9-7.7	17.3	15.3-19.8
135 - 155										
Grade No. 1	19.5	18.0-21.0	15.7	13.8-17.3	9.6	8.2-11.1	7.6	6.4-8.3	15.8	12.9-18.2
Grade No. 2	18.5	16.7-20.6	14.6	12.4-16.3	9.1	7.6-10.3	7.1	5.7-8.3	16.3	13.6-20.0
Grade No. 3	17.2	15.5-20.4	13.4	11.3-14.7	8.8	8.1-9.6	6.7	5.4-7.6	17.8	14.5-20.5
155 - 175										
Grade No. 1	19.6	18.4-20.9	15.6	14.4-18.4	9.5	8.4-10.7	7.4	6.3-8.0	15.6	12.6-17.3
Grade No. 2	18.3	16.4-20.2	14.4	12.5-16.3	9.0	7.9-10.4	7.0	5.9-8.2	16.8	13.7-19.8
Grade No. 3	16.9	15.2-17.8	13.4	11.8-14.8	8.4	7.7-9.2	6.6	5.6-7.3	17.7	15.7-21.3

EXHIBIT 1. PRICES FOR DIFFERENTIAL STUDY, PER 100 POUNDS

LOINS

Weight range	<u>10 - 12</u>	<u>12 - 14</u>	<u>14 - 16</u>	<u>16 - 20</u>
Average	\$50.69	\$48.52	\$48.52	\$44.76

BOSTON BUTTS

Weight Range	<u>4 - 6</u>	<u>6 - 8</u>	<u>8 & up</u>
Average	\$43.22	\$43.22	\$40.82

MISCELLANEOUS

<u>Hind</u> <u>feet</u>	<u>Front</u> <u>feet</u>	<u>Tails</u>	<u>Fat</u> <u>trimmings</u>	<u>Regular</u> <u>trimmings</u>	<u>Neck</u> <u>bones</u>	<u>Spare</u> <u>ribs</u>	<u>Jowls</u>
\$5.00	\$8.33	\$15.36	\$12.50	\$25.02	\$12.98	\$40.00	\$20.94

PICNICS

Weight range	<u>6 - 8</u>	<u>8 & up</u>	<u>Clear plates</u>	<u>Hocks</u>
Average	\$33.13	\$30.78	\$12.50	\$22.00

SKINNED HAMS

Weight range	<u>8 - 10</u>	<u>10 - 12</u>	<u>12 - 14</u>	<u>14 - 16</u>	<u>16 - 18</u>
Average	\$53.00	\$54.58	\$53.55	\$53.17	\$52.21

FAT BACKS

All priced as fat at \$12.50

BELLIES

Weight range	<u>6 - 8</u>	<u>8 - 10</u>	<u>10 - 12</u>	<u>12 - 14</u>	<u>14 - 16</u>
Average	\$50.02	\$50.01	\$47.72	\$45.69	\$43.69

(1) Adapted from National Provisioner Daily Market Service reports, July 1, 1953 to June 30, 1954.



